



# Electric Vehicles and Car Dealers

## Basic Information to Help Consumers Make Informed Decisions

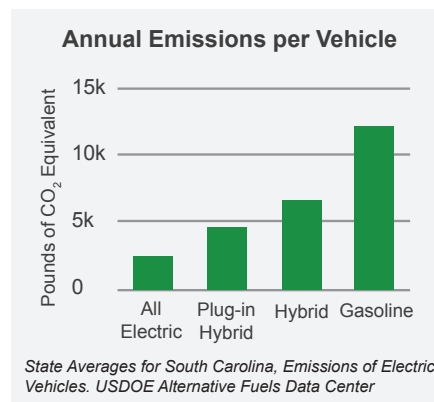
For many consumers, a visit to the car dealership is the first step in the purchase of a vehicle. It is important for dealers to know about electric vehicles (EVs) so that they can help consumers make an informed decision.

### Why Consumers May Consider an EV

#### Good for the Environment

A gasoline vehicle's internal combustion engine produces direct emissions through the tailpipe, through evaporation from the vehicle's fuel system, and during the fueling process. EVs produce zero direct emissions.

The type of energy source powering the charging station can impact an EV's overall emissions. Even when the electricity for powering an EV is produced using a less clean power source, the higher efficiency of an EV results in a net reduction of polluting emissions.



#### Fun to Drive

EVs are known for smooth handling and quietness. With the battery pack located at very low center-of-gravity and little noise from acceleration, an EV is nimble, responsive, and peaceful when compared to its traditional internal combustion engine counterparts. EVs are also quick to accelerate with excellent throttle response. One of the many benefits of an electric-traction motor is its instant torque, with full torque at zero RPM.

#### Lower Cost to Maintain and Drive

EVs have a fraction of the moving parts of internal combustion engines. Consumers benefit from the lack of routine vehicle maintenance such as engine air intake changes, oil changes, fan belt replacements, and other maintenance jobs typical with a gasoline vehicle. As a result, EVs only need to be serviced once or twice a year.

PHEVs are similar to a gasoline vehicle in terms of routine maintenance, oil changes, air filter changes, and other various

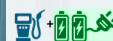
### Types of EVs

#### Hybrid Electric Vehicles (HEVs)



HEVs are powered by an internal combustion engine and by an electric motor that uses energy stored in a battery. The vehicle does not plug in to an electrical power source to charge.

#### Plug-in Hybrid Electric Vehicles (PHEVs)



PHEVs are powered by an internal combustion engine and an electric motor that uses energy stored in a battery. The vehicle can be plugged into an electrical power source to charge the battery or operate solely on gasoline.

#### Battery Electric Vehicles (BEVs)



BEVs use a battery to store electricity. Batteries are charged by plugging the vehicle into an electrical power source.

maintenance jobs. PHEVs have a regenerative braking system and an electric engine. These technologies can reduce wear and tear on vehicle components and result in lower lifetime maintenance costs.

Currently, the cost to charge an EV is usually less than half the cost to fill a vehicle with gasoline or diesel.

## Maintaining an EV

EVs have traditional friction brakes, but brakes tend to last much longer on an EV than on gasoline vehicles. Brakes can last much longer if the driver relies heavily on the regenerative braking system. When a driver presses the brake pedal to engage the vehicle's friction brakes, the regenerative system engages so the friction brakes do not have to do all of the work on their own.

## Charging

The majority of charging sessions will take place at a level 1 or 2 charging station at a consumer's home, parking garages, hotels, or when parked at other destinations. DC fast charging is commonly used for highway driving and is the quickest option to charge an EV's battery.



### Used EVs

Several manufacturers of EVs offer an 8-year/100,000-mile battery warranty. Predictive modeling by the National Renewable Energy Laboratory indicates that EV batteries can last 12 to 15 years in South Carolina's moderate climate. As more used EVs come on the market, they can offer consumers a lower-cost option for entering into EV ownership.

Regular tire rotations are as important for EVs as they are for all vehicles. It is imperative to check the air in an EV's tires on a regular basis and have them inspected periodically to make sure tires are properly balanced and aligned.

Like gasoline vehicles, EVs have a thermal management system that requires coolant. EVs also require wiper, refrigerant, and other fluid refills.

Type	Voltage (V) / Kilowatt (kW)	Charging Time
<b>Level 1</b> <i>Alternating Current (AC)</i>	120v 1.3-1.9kW	2 to 5 miles of range per hour of charging
<b>Level 2</b> <i>Alternating Current (AC)</i>	240V 3.3-17kW	10 to 20 miles of range per hour of charging
<b>DC Fast Charging</b> <i>Direct Current (DC)</i>	480V 50-350kW	60 to 200 miles of range per 20 minutes of charging

### Lithium-ion Batteries

Most PHEVs and EVs use lithium-ion batteries, such as those found in a cell phone or laptop. Lithium-ion batteries are known for a high power-to-weight ratio, energy efficiency, optimal high-temperature performance, and low self-discharge.

### Battery Recycling

While the battery recycling industry is rapidly developing, only a few centers are currently in operation. The majority of EV batteries are repurposed rather than recycled. Repurposed EV batteries can help to store energy for other uses such as back-up power for the electric grid or to run smaller electronics.

## Resources

National Renewable Energy Laboratory  
[www.nrel.gov](http://www.nrel.gov)

US Department of Energy- Alternative Fuels Data Center  
[www.afdc.energy.gov](http://www.afdc.energy.gov)

US Department of Energy- eGallon  
[www.energy.gov/maps/egallon](http://www.energy.gov/maps/egallon)

US Department of Energy/Environmental Protection Agency- Fuel Economy  
[www.fueleconomy.gov](http://www.fueleconomy.gov)

